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FACTOR ANALYSIS OF THE CONNERS TEACHER RATING SCALE WITH BRAIN-DAMAGED AND LEARNING-DISABLED CHILDREN

KURT A. MOEHLE
Psychological Laboratories of Indianapolis and Indiana University School of Medicine

KATHLEEN B. FITZHUGH-BELL
Indiana University School of Medicine

Prior studies have indicated a possible lack of stability in the factor structure of the Conners Teacher Rating Scale (CTRS) across populations of children. The current study examined this factor structure in a sample of medically referred brain-damaged and learning-disabled children. Six factors were extracted: Conduct Disorder, Hyperkinesis, Distractibility, Depression, Dyssocial behavior, and Introversion. Comparison with prior work indicates that factors of conduct disorder, hyperkinesis, and a social behavior factor are fairly common, but that disparities regarding other factors exist. Cross-validation of the factor structure in each new population for which CTRS is to be used is recommended.

The need continues for objective methods of evaluating complaints of emotional and behavioral disturbances in children. Cost-effective techniques are needed for purposes of monitoring the impact of various interventions, life events, treatments, and situational elements; e.g., medications, behavioral management strategies, illnesses, surgeries, and changes in home and school, as well as evaluating the complaints of emotional and behavioral disturbance in children referred for neuropsychological examination.

The Conners Teacher Rating Scale (CTRS) (Conners, 1969, 1973) has played a major role in filling such a need for two decades. The CTRS has been found useful for studying children's attitudes associated with academic achievement (Bruck, 1985), hyperactivity and blood lead levels (Yule, Urbanowicz, Lansdown, & Miller, 1984), peer relationships and aggressiveness (Schneider, Ledingham, Byrne, Oliver, & Poirier, 1985), social competence (Beck, Collins, Overholser, & Terry, 1985), behavior problems and maternal depression (Schaughency & Lahey, 1985), fathers' job satisfaction and children's hyperactivity and conduct problems (Barling, 1986), efficacy of various behavioral and cognitive-behavioral therapies (Braswell, Kendall, Braith, Carey, & Vye, 1985; Saylor, Benson, & Einhaus, 1985), vestibular and visual rotation stimulation effects (Arnold, Clark, Sachs, Jakim, & Smithies, 1985), and medication interventions (Conners, 1969; Dulcan, 1985; Ottinger, Halpin, Miller, Demian, & Hanneman, 1985; Sprague, Christensen, & Werry, 1974; Weizman, Weitz, Szekely, Tyano, & Belmaker, 1984; Werry, Sprague, & Cohen, 1975).

The inattention/overactivity and aggression subscales have proven useful for teachers distinguishing between externalizing behaviors in a classroom setting, as verified by independent observer ratings (Milich & Fitzgerald, 1985). The CTRS has even been used to distinguish abused from neglected children in classroom behavior (Salzinger, Kaplan, Pelcovitz, Samit, & Krieger, 1984). In short, the CTRS has proven very useful and popular in child clinical research and practice.

Questions have been raised, however, concerning the psychometric soundness of the CTRS (Ullmann, Sleator, & Sprague, 1985). Although many of the objections to

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Send reprint requests to Kurt A. Moehle, Psychological Laboratories of Indianapolis, 3190 N. Meridian, Indianapolis, IN 46208.

the use of this inventory involve the less reliable short form (Conners, 1973), concerns have also been raised about the stability of the factor structure of the long form across different clinical and normal child populations (Cohen & Hynd, 1986; Trites, Blouin, & LaPrade, 1982; Werry et al., 1975).

Inconsistency in the factor structure has contributed to construct confusion and questioning of the validity of current classifications of childhood syndromes (Koriath, Gualtieri, Van Bourgondien, Quade, & Werry, 1985; Reynolds & Stark, 1986). Some authors, on the other hand, have blamed the CTRS, suggesting abandonment of the CTRS as a research tool (Ullmann et al., 1985).

Originally developed to aid in diagnosis of hyperactive children and evaluate treatment effects (Conners, 1969), the CTRS has been revised and several different versions have been developed (Conners, 1970, 1973; Goyette, Conners, & Ulrich, 1978). The final 39-item version (Conners, 1973) has found wide acceptance and has been employed by the National Institute of Mental Health for drug studies in children (cf. Cohen & Hynd, 1986).

Given the importance of the CTRS in treatment studies of various types, further examination of the factor structure in more diverse clinical populations is needed to determine if the CTRS is indeed measuring the same constructs across groups. Such information is crucial before clinicians and researchers make further inferences about the children being assessed, based on CTRS scores. Resolution of this confusion and accurate diagnosis are essential because failure to diagnose and treat childhood disorders can have devastating impact.

Clinical and sociometric studies have shown that the social consequences of hyperactivity, for example, are considerable. Hyperactive children are seen by peers as being more aggressive, less likable, and more likely to be the targets of aggression (Schneider et al., 1985). The CTRS could serve as an inexpensive screening device for such a disorder if the factor structure proves relatively robust across groups.

Conners' (1969) original factor analysis of the CTRS produced five factors: conduct disorder, inattentive-passive behavior, tension-anxiety, hyperactivity, and sociability. Conners examined, however, a rather narrowly defined sample of 103 children with behavioral problems (consisting mostly of short attention span and hyperactivity) who were admitted to a clinic and judged to be appropriate candidates for chemotherapy. The children averaged approximately nine years of age.

Werry et al. (1975) factor analyzed CTRS results from 291 normal classmates of hyperactive children. These analyses produced Conners' first factor of conduct disorder, but their second factor of hyperactivity resembled a combination of Conners' second (inattentive-passive) and fourth (hyperactive) factors. Finally, Werry et al. found Conners' third factor (tension-anxiety) to be unstable, breaking into four factors labeled tension-anxiety, shyness, helplessness, and absence from school. Although they analyzed the slightly modified revised CTRS (Conners, 1973), rather than the original CTRS analyzed by Conners (1969), the differences in factor structure still raised concerns about the psychometric stability of the CTRS across different groups of children.

Trites et al. (1982) conducted a very large scale factor analysis of 9,583 normal Canadian school children. Six factors were extracted from these data. The first factor (hyperactivity) actually appears to be a mix of Conners' hyperactivity and conduct disorder factors (Cohen & Hynd, 1986). The second factor corresponds largely to Conners' conduct disorder factor. The third factor (emotional overindulgence) corresponds to aspects of earlier tension-anxiety and conduct disorder factors. The fourth factor (anxiety-passivity)

contains elements of Conners' tension-anxiety factor and the Werry et al. shyness and helplessness factors. The fifth factor (asocial) matches the Conners and Werry et al. factors having to do with sociability. The sixth factor consists simply of four items that involve daydreaming and attendance problems.

The chief difference between the Trites et al. factor structure and structures obtained in prior work is the emergence of a first factor that loads heavily on a hyperactivity dimension, as well as conduct disorder dimension, rather than the purer conduct disorder dimension seen in the first factor extracted in prior studies (Conners, 1969; Werry et al., 1975).

More recently, Cohen and Hynd (1986) investigated the CTRS factor structure in a diverse special education population ($N = 138$) comprising behaviorally disordered, emotionally disordered, learning-disabled, and educable mentally handicapped children in a public education system. Their analysis produced a first factor of conduct disorder, as had all earlier major studies except Trites et al. (1982).

The second Cohen and Hynd factor was an attention deficit-hyperactivity factor, a combination of Conners' second (inattention-passivity) and fourth factors (hyperactivity). The third factor (anxiety-passivity) resembled a combination of Conners' factors II and III (inattentive-passive and tension-anxiety). The fourth factor (depression) consisted of only four items, two of which came from Conners' third factor (tension-anxiety). The fifth factor was excluded from further analysis as it contained only two items.

Cohen and Hynd's findings cast doubt on the clinical utility of Conners' factors II and III, and the discrepancies between studies to date have demonstrated the need to confirm empirically the factor structure of the CTRS on each population with which it is used.

The purpose of the current study was to examine the factor structure of the 39-item version of the CTRS with brain-damaged and learning-disabled children – children not yet addressed in this literature. Many prior studies had used the questionably reliable 10-item shorter version or had used small sample size in clinical populations; none had examined the factor structure in this particular clinical population in a medical center setting.

Because our sample more closely approximates Conners' (1969) and Cohen and Hynd's (1986) than the normal samples of Werry et al. (1975) or Trites et al. (1982), we expected findings more in line with the results of the former investigators. That is, we anticipated extracting first a conduct disorder factor, then an inattention factor, followed by an anxiety factor, then either a hyperactivity or depression factor (Conners vs. Cohen & Hynd, respectively), and, finally, a sociability factor.

Method

Subjects

Subjects were 284 children between the ages of 3 and 17 who were referred to a neuropsychology laboratory in a large midwestern United States medical center. These children were referred from other clinics and services within the medical center, and usually were experiencing either neurological dysfunction, academic problems thought to be related to brain dysfunction, or atypical function.

In the course of their thorough medical work-ups, 112 of the children were diagnosed by neurologists or neurosurgeons as having brain damage, while three children had brain

damage clearly ruled out, and in 169 cases it was not possible to confirm presence of brain damage despite thorough medical work-up.

In the current study, the children with confirmed brain damage were grouped together (the brain-damaged group), and the children in whom presenting learning difficulties were not clearly correlated with documentation of brain damage (the learning-disabled group) were grouped together. Demographic and medical variables describing the sample are presented in Table 1.

Table 1
Demographic and Medical Variables for the Sample

	Confirmed Cerebral Pathology (Brain Damaged) ($n = 112$)	Cerebral Pathology Not Confirmed (Learning Disabled) ($n = 172$)
Age	9.96 (3.68)	9.84 (3.02)
range	4-17	5-17
Education	3.50 (3.30)	3.29 (2.87)
range	0-11	0-11
FSIQ	87.09 (14.98)	94.91 (17.32)
range	38-121	44-136
VIQ	88.19 (14.58)	94.36 (17.06)
range	45-120	45-133
PIQ	87.82 (16.39)	96.63 (18.22)
range	44-129	45-151
Sex M	67 (60%)	125 (73%)
F	45 (40%)	47 (27%)
Race:		
white	108 (96%)	162 (94%)
nonwhite	4 (4%)	10 (6%)
CTRS Respondent		
Father	32%	26%
Mother	49%	47%
Teacher	19%	27%

Note. Age, education (in years), and IQ numbers are means (with standard deviations in parentheses).

Examination of achievement test scores for the sample indicated that a variety of measures were used across time and across children, depending upon the presenting problem. The test that provided the largest subsample was the Wide Range Achievement Test, 1965 edition. Discrepancy scores of chronological age minus grade level equivalency were calculated for a subsample (37 brain-damaged and 52 learning-disabled children) and the results were submitted to multiple analysis of variance (MANOVA) (SPSSx, 1983) in a 3 (reading, spelling, arithmetic) × 2 (LD and BD children) design. Results were nonsignificant, Wilk's approximate $F = .983$ (3, 85), $p = .691$. Thus, both groups were experiencing learning problems, with roughly equivalent discrepancies between chronological age and grade level equivalency, on an academic achievement measure.

The three chief etiologies for the brain-damaged group were "congenital" disorders, including complications of gestation or birth (32%), trauma (22%), and infection (20%). Other etiologies included neoplasm (3%), metabolic disorders (3%), vascular disorders (3%), degenerative disorders (3%), a combination of other rarer disorders (4%), and cases in which etiology was unclear or mixed (10%). Although the great majority of the learning-disabled children did not have any presumed cerebral etiology, 11% did have a history of congenital disorders and complicated birth circumstances, and 7% had experienced head trauma, but without documented brain damage, despite their history.

Procedures

The Conners Teacher Rating Scale (CTRS) (Conners, 1969) was administered to the parents and/or teacher of the child as part of a comprehensive neuropsychological examination.

Statistical Analyses

The 39 CTRS items were submitted to factor analysis (SPSSx, 1983) using principle components analysis and varimax rotation, as in prior studies in this area. Items were retained in a factor if they correlated at or above the .40 level with the factor, and the number of factors extracted was determined by a combintion of the Kaiser criterion and Scree test (cf. Zwick & Velicer, 1986).

The internal consistency of each factor was analyzed by computing Cronbach's alpha (Nunnally, 1978) for each factor, using the SPSSx Reliability program, model Alpha (SPSSx, 1983).

Factor scores were then calculated for each group using unit weighting and calculation of means for each factor (Trites et al., 1982). These results were submitted to multiple analysis of variance (MANOVA) (SPSSx, 1983) and subsequent follow-up univariate *F* tests for individual factor scores, with sample groups (brain-damaged vs. learning-disabled) as the factor or independent variable and factor scores for each group as the dependent variables. Descriptive factor score data were generated for both groups of children.

Results and Discussion

Results of the factor analysis are presented in Tables 2 and 3.

Results of the analysis of internal consistency are presented in Table 4, along with comparisons with several other prior studies. An overall comparison of current results with prior work is presented in Table 5.

Descriptive data on factor scores for the current sample are presented in Table 6.

A factor score of 1.5 or greater (a factor score consists of the average item score for the factor with each CTRS item scored on a 0-3 scale) has been found to be predictive of educational or behavioral problems and of greater utilization of psychological services in groups of children (Sprague et al., 1974). Thus, the number of children exceeding this cutoff may be clinically relevant. The percent of children in the current sample who exceeded this cutoff score on each of the six factors is presented in Table 7.

The CTRS factor scores of the brain-damaged children were compared to those of the learning-disabled children, using a MANOVA procedure. Results were significant, Wilks approximate $F = .9378$ (6, 135), $p = .007$. Follow-up univariate *F* test results are presented in Table 8.

Table 2
Factor Loadings for CTRS

Item	Factors					
	I					
Item 31	.79424	.05813	.01033	.09308	.10219	.02627
Item 32	.79242	.05377	−.04869	.02372	.05349	.13114
Item 15	.76388	−.00021	.01241	.28323	.21624	.17643
Item 38	.70303	.16880	.19435	.02653	.09175	.03294
Item 36	.70275	.09406	.13243	.11747	.17045	−.04182
Item 21	.67750	.16497	−.00545	.39167	.00829	.05352
Item 18	.63886	.26015	.07059	.03152	.06161	−.08545
Item 25	.62646	.10826	.13858	.07596	.25016	−.04492
Item 29	.61935	.16004	.14800	−.07825	.22075	−.02440
Item 14	.58321	.30934	.27514	−.09170	.17844	−.00055
Item 17	.57998	.13015	−.07993	.12790	.03330	.31308
Item 3	.55210	.37561	.07669	.27985	−.00523	−.01919
Item 16	.53378	.13150	−.01007	.49780	.07234	.32880
Item 20	.48496	.14116	.26081	.08634	.06547	.07389
Item 35	.39275	.30309	.33380	.33930	.11397	−.10530
		II				
Item 1	.19431	.80698	.09841	.11835	.09466	.09100
Item 5	.24895	.74307	.19774	.15908	.02473	−.01447
Item 2	.19905	.72994	.00365	.02811	.06306	.11020
Item 6	.43374	.48393	.26005	.29900	−.02114	.04567
Item 4	−.09542	.41089	.15097	−.00095	.28125	−.20350
			III			
Item 8	.28343	.26539	.71674	−.07415	.05010	.20157
Item 24	.08982	−.02966	.71328	.18069	.04091	−.10915
Item 26	.02627	.01552	.71112	−.00844	.15640	.08111
Item 7	.22370	.39309	.67589	−.08857	.06823	.10390
				IV		
Item 9	.13408	.16626	−.03724	.69691	.03695	.16894
Item 37	−.02433	.07778	.12742	.69307	−.01911	−.15906
Item 10	.15514	.06091	.11189	.58625	.09423	.40252
Item 13	.26444	.01318	−.09499	.56551	.20909	−.02754
					V	
Item 27	.21412	.10101	.04625	.08121	.83757	.10535
Item 28	.26815	.07037	.12587	.14540	.82704	.06883
Item 23	.25358	.04058	.18932	.05847	.51636	.30824
						VI
Item 22	.06746	.01538	.03253	.05343	.19766	.64657
Item 11	−.10248	.11093	.46643	.02956	.05523	.56578
Item 12	.42734	.05263	.06783	.31289	.08078	.46560

Table 3
Brief Descriptions of CTRS Items in Each Factor

Factor 1 Aggressive Conduct Disorder	Factor 2 Hyperkinetic	Factor 3 Distractible
31- Defiant	1- Fidgets	8- Attn. Span
32- Disrespectful	5- Restless	24- Easily Led
15- Quarrelsome	2- Hums	26- No leadership
38- Uncooperative	6- Excitable	7- Inattentive
36- Stubborn		
21- Temper		
18- Destructive		
25- No fair play		
29- Teases		
14- Disturbs		
17- "Smart"		
3- Demanding		
16- Moody		
20- Lies		
35- Demands Attention		

Factor 4 Dependent-Depressed	Factor 5 Dyssocial	Factor 6 Sad Introvert
9- Sensitive	27- Opposite Sex	22- Isolates
37- Tries to please	28- Same Sex	11- Daydreams
10- Sad	23- Unaccepted	12- Sullen
13- Cries		

Table 4
Internal Consistency of CTRS Factors Across Studies

	Moehle & Fitzhugh-Bell(1989)		Conners (1973)		Cohen & Hynd (1986)	
I.	Conduct Disorder	.92	Conduct Disorder	.91	Conduct Disorder	.94
II.	Hyperkinetic	.77	Inattentive-passive	.90	A.D.D. Hyperactive	.91
III.	Distractible	.78	Tension-anxiety	.42	Anxiety-passivity	.77
IV.	Dependent-Depressed	.67	Hyperactive	.90	Depression	.71
V.	Dyssocial	.78				
VI.	Introvert	.39				

Note. Coefficient Alpha was used in the current study.

Table 5
Comparison of Factor Analytic Results Across Studies

	Study			
Factor	Moehle Fitzhugh-Bell (1989)	Conners (1969)	Cohen & Hynd (1986)	Trites et al. (1982)
Factor 1	Conduct Disorder	Conduct Disorder	Conduct Disorder	Hyperactive
Number of Items	15	17	17	17
Variance	28%	36%	34%	36%
Factor 2	Hyperkinesis	Inattentive-passive	A.D.D.-Hyperactive	Conduct Disorder
Number of Items	5	6	11	13
Variance	8%	16%	10%	11%
Factor 3	Distractibility	Tension-Anxiety	Anxiety-Passivity	Emotional
Number of Items	4	8	7	8
Variance	7%	12%	6%	6%
Factor 4	Dependent-Depressed	Hyperactive	Depression	Anxious-Passive
Number of Items	4	8	4	6
Variance	5%	20%	5%	5%
Factor 5	Dyssocial	Sociability		Asocial
Number of Items	3	4		5
Variance	4%	14%		3%
Factor 6	Introvert			Inattention
Number of Items	3			4
Variance	3%			3%

Table 6
Factor Scores for the Current Sample

	Factor Scores		
	Brain Damaged ($n = 112$)	Learning Disabled ($n = 172$)	Total Sample ($N = 284$)
I.	.91 (.63)	1.03 (.70)	.91 (1.06)
II.	1.17 (.73)	1.28 (.73)	1.24 (.73)
III.	1.54 (.79)	1.74 (.76)	1.66 (.78)
IV.	1.13 (.70)	1.03 (.67)	1.07 (.68)
V.	.40 (.57)	.68 (.81)	.57 (.74)
VI.	.86 (.64)	.89 (.59)	.88 (.61)

Note. Factor scores were calculated by adding item ratings and dividing by the number of items in each factor. Scores presented are means, with standard deviations in parentheses.

Table 7
Percents of Groups Above Clinical Cutoff Points

Factor	Total Sample ($N=284$)	Learning Disabled ($n=172$)	Brain Damaged ($n=112$)
Conduct Disorder	22%	25%	17%
Hyperkinesis	36%	40%	31%
Distractibility	66%	70%	60%
Dependent-Depressed	29%	28%	31%
Dyssocial	14%	18%	6%
Introversion	16%	16%	16%

Note. The convention of regarding a score of 1.5 or above on a factor as clinically significant (Sprague et al., 1974) was used to determine cutoff points.

Table 8
Follow-up ANOVAs on Factor Scores of BD and LD

		F-Tests (1,277)	
	Factor	*F*-Value	*p*
I.	Conduct Disorder	1.992	.159
II.	Hyperkinesis	1.379	.242
III.	Distractibility	4.236	.041*
IV.	Dependency-Depression	1.352	.246
V.	Dyssocial	10.608	.001*
VI.	Introverted	.245	.621

*Significant at .05 level. (Learning-disabled children scored higher than brain-damaged children in both instances.)

As predicted, a conduct disorder factor was extracted first, but the second factor was a hyperkinesis factor rather than an inattention factor. The inattention or distractibility factor was derived third, followed by dependent-depressed, dyssocial, and introversion factors. In short, our hypotheses were largely confirmed concerning the major factors of the CTRS with a brain-damaged and learning-disabled population, while the minor factors varied somewhat.

Although at first glance these results seem somewhat discrepant with those of Conners (1969), closer examination of Conners' factor analysis indicates that, even though the hyperactivity factor was extracted fourth, it accounted for the second largest amount of variance (20%) after the first factor of conduct disorder (36%). In terms of variance accounted for, Conners' first three factors would be conduct disorder, hyperactivity, and inattentiveness. These match well with our first three factors of conduct disorder, hyperkinesis, and distractibility.

The current findings are fairly consistent with prior work with clinical samples, especially regarding the major factors of conduct disorder and hyperactivity (Cohen & Hynd, 1986; Conners, 1969). The sociability factor was also fairly robust across studies. In addition, all four of the current distractibility factor items were found on Conners' (1969) six-item inattentive-passive factor.

Items involving more internalized behaviors typically identified with adult depression or introversion seem to be less stable in clinical child populations. Internal consistency values for the current dependency-depression factor and sad-introversion factor were .67 and .39, respectively, whereas alpha coefficients for the other factors were .77 or greater.

Similarly, Conners' (1973) lowest internal consistency correlation was for his tension-anxiety factor (.42). In contrast, Cohen and Hynd (1986) obtained a moderate correlation of .77 for their anxiety-passivity factor and .71 for their depression factor. Those results, however, lack support from other studies.

Cohen and Hynd's (1986) findings had cast doubt on the clinical utility of Conners' (1969) factors II (inattention-passivity) and III (tension-anxiety). Although the current results lend some support to the stability of a distractibility factor (inattention-passivity), they do not support the tension-anxiety factor. Instability of this factor was found also in a normal sample (Werry et al., 1975).

Although the main CTRS factors seem to be largely comparable across clinical groups, there may be some difficulty generalizing to normal groups of children. Clear differences are seen in comparing the current results to those of the Trites et al. (1982) large Canadian sample of normal children. Their two largest factors, in terms of variance explained, were hyperactivity (36%) and conduct disorder (11%). Unlike the current study and other studies, the hyperactivity factor accounted for more variance than did the conduct disorder factor.

It appears the CTRS may be measuring something somewhat different in normal vs. clinical child groups, so separate norms and factor structures may be necessary. It should be noted, however, that rational analysis of items in the hyperactivity factor of Trites et al. indicates that it may actually be a combination of hyperactivity and conduct disorder items (Cohen & Hynd, 1986).

Contrary to Werry et al. (1975), and in accordance with Conners (1969), the current results support separation of inattentiveness and hyperkinesis. The use of clinical samples vs. normals may be the key element in this discrepancy. The Werry et al. sample was composed of normal children, whereas the Conners sample and the current sample were clinical groups.

As might be expected, the incidence of hyperactivity in the current sample was somewhat higher (36%) than in the Trites et al. (1982) normal Canadian sample (21% for boys, 8% for girls), using a 50% or greater cutoff (1.5 or above on the hyperactivity factor). It should be noted that their hyperactivity factor incorporates elements of conduct disorder (Cohen & Hynd, 1986). Therefore, our hyperkinesis factor may not be directly comparable.

One possible criticism of the current study is the use of a nontraditionally defined learning-disabled (LD) sample. Classic definitions of learning disability usually involve significant discrepancy between IQ and achievement scores. Our LD sample was more pragmatically defined by chief reason for referral (academic problems secondary to suspected brain damage) coupled with absence of medically confirmable brain damage. Some may take issue with such a definition of "learning disabled." Our feeling is, however, that these children represent the population of children who are having academic difficulties due to probable minor brain damage or dysfunction, which medical diagnostic methods did not detect—possibly due to the fact that such methods were not intensively employed in some cases—and thus represent the population of children with a probable brain-based learning disability. We recognize, however, that this position is arguable.

Implications for clinical practice include the injunction for clinicians to note elevations on the CTRS, since children with elevated scores have been found to have more educational and behavioral problems, and are referred more for psychological services (Sprague et al., 1974, Trites et al., 1982).

The current study indicates that a fairly large proportion of children with confirmed brain damage and of learning-disabled children with suspected brain damage have significant elevations on a number of CTRS factors. Children with confirmed damage and children with "soft signs" of brain damage that are not confirmed by current medical technology may be somewhat similar in external behaviors, as evidenced by agreement across several factor scores.

Despite these similarities, there are important differences between the groups as evidenced by significant MANOVA results in which distractibility and dyssocial factor scores were more elevated in the learning-disabled children without documented brain pathology.

Future research should involve further investigation of the current differences between learning-disabled and brain-damaged children in CTRS factor scores. Examination of classically defined LD samples in contrast to brain-damaged and conduct-disordered children is needed.

Further examination of the relationship between the behaviors of children with learning disorders and brain damage is particularly needed. Increasing evidence supports the connection between learning problems with accompanying neurological "soft signs" and frank brain damage. Both may be points on a continuum of cerebral dysfunction, with the physiological and structural aspects of learning disability being too subtle to be detected by currently employed medical diagnostic methods.

This research might begin with detailed investigation of behavior-ability relationships through examination of correlations between ability measures, such as psychometric intelligence measures and neuropsychological measures, and behavior rating scale results. This should be examined across populations.

The factor structure of the CTRS must also be examined across societies and cultures and between sexes in different populations. It has been found, for example, that Italian boys produced a different factor structure than did Italian girls, with hyperactivity and conduct problems (factor I for boys) being divided into two factors for girls (O'Leary, Vivian, & Nisi, 1985). Further studies of this type are needed.

Sex differences in hyperactivity have been documented, with hyperactive girls differing from hyperactive boys in that the girls do not have an impulsive response style and also have few conduct problems. They do, however, manifest classical hyperactive symptoms of poor attention span and decreased concentration (Dehaas & Young, 1984). Such sex differences need to be examined across different clinical populations, including learning-disabled and brain-damaged children, and at differing ages.

In conclusion, the most robust factors of the CTRS across clinical populations appear to be conduct disorder and hyperactivity, with a sociability factor also represented. However, in contrasting brain-damaged and learning-disabled children, the current results indicate that the distractibility factor is also important. These results support the continued clinical and research use of the CTRS as a brief but sensitive objective instrument for assessing child behaviors in clinical populations.

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COMPARISON OF SCORES FOR INTELLECTUALLY GIFTED STUDENTS ON THE WISC-R AND THE FOURTH EDITION OF THE STANFORD-BINET

LEADELLE PHELPS

University of Missouri-Columbia

The WISC-R and the Fourth Edition of the Stanford-Binet (SB: FE) were compared in the identification and assessment of 48 intellectually gifted students in the primary and secondary grades. While only a 3.2-point difference between the mean SB: FE Composite score and the mean WISC-R Full Scale score was found, ($r = .393$, $p. \leq .01$), the t test between the two scores was significant ($t = 2.30$, $p \leq .05$). Correlations between the three scales of the WISC-R and the SB: FE four broad area and Composite scores ranged from $-.219$ (SB: FE Abstract/Visual Reasoning with WISC-R Verbal) to .599 (SB: FE Short-Term Memory with WISC-R Full Scale). Within the correlational matrix, only 5 of the 15 correlations were significant. Both the SB: FE Abstract/Visual Reasoning and Quantitative Reasoning Area scores had no significant correlations with any of the WISC-R scores.

The Fourth Edition of the Stanford-Binet Intelligence Scale (SB: FE) (Thorndike, Hagan, & Sattler, 1985) is markedly different from previous forms of this test. While there are some threads of similarity in content and item types, the format, theoretical model, and testing procedures have changed considerably. The authors have gone to great effort to modernize the test by using sophisticated psychometric procedures (e.g., item response theory and ethnic bias analysis) and developing a three-level hierarchical model as the theoretical basis for the scale (Thorndike, Hagan, & Sattler, 1986).

The previous 1972 edition of the Stanford-Binet has been subjected to numerous concurrent validity studies. Results consistently demonstrated that the measure was highly verbal in nature (Sattler, 1982). This characteristic was considered an advantage in the identification of gifted youngsters, for academic success in our society is largely a function of verbal comprehension, fluency, and reasoning. However, the psychometric properties of the various scores within the SB: FE need to be thoroughly investigated with the gifted population. A substantial amount of concurrent validity research has yet to be published, due to the recency of the instrument. To date, the main source of infor-

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Send reprint requests to LeAdelle Phelps, Dept. of Educational and Counseling Psychology, 16 Hill Hall, University of Missouri-Columbia, Columbia, MO 65211.